



PRODUCT CATALOGUE



TAVRIDA ELECTRIC IS A GROUP OF COMPANIES THAT SPECIALIZES IN THE DEVELOPMENT AND MANUFACTURE OF INNOVATIVE SWITCHGEAR PRODUCTS FOR INDOOR AND OUTDOOR APPLICATIONS IN MEDIUM VOLTAGE (MV) SMART GRIDS. TAVRIDA ELECTRIC CONDUCTS EXTENSIVE RESEARCH AIMED AT DEVELOPING NEW SWITCHING AND CONTROL TECHNOLOGIES, WITH A PRIMARY FOCUS ON RESOLVING CUSTOMER PROBLEMS NOT MET BY CURRENT PRODUCTS ON THE MARKET.



ADVANTAGES

-  MAINTENANCE FREE
-  MOST COMPACT DIMENSIONS AND WEIGHT
-  HIGH OPERATIONAL SPEED
-  EASE OF USE AND OPERATOR'S SAFETY
-  ENVIRONMENTAL SAFETY



PRODUCT RANGE

VACUUM CIRCUIT BREAKERS

High performance vacuum circuit breakers for compact switchgear designs, existing plant refurbishment/retrofit programs and special applications.



AUTOMATIC CIRCUIT RECLOSERS

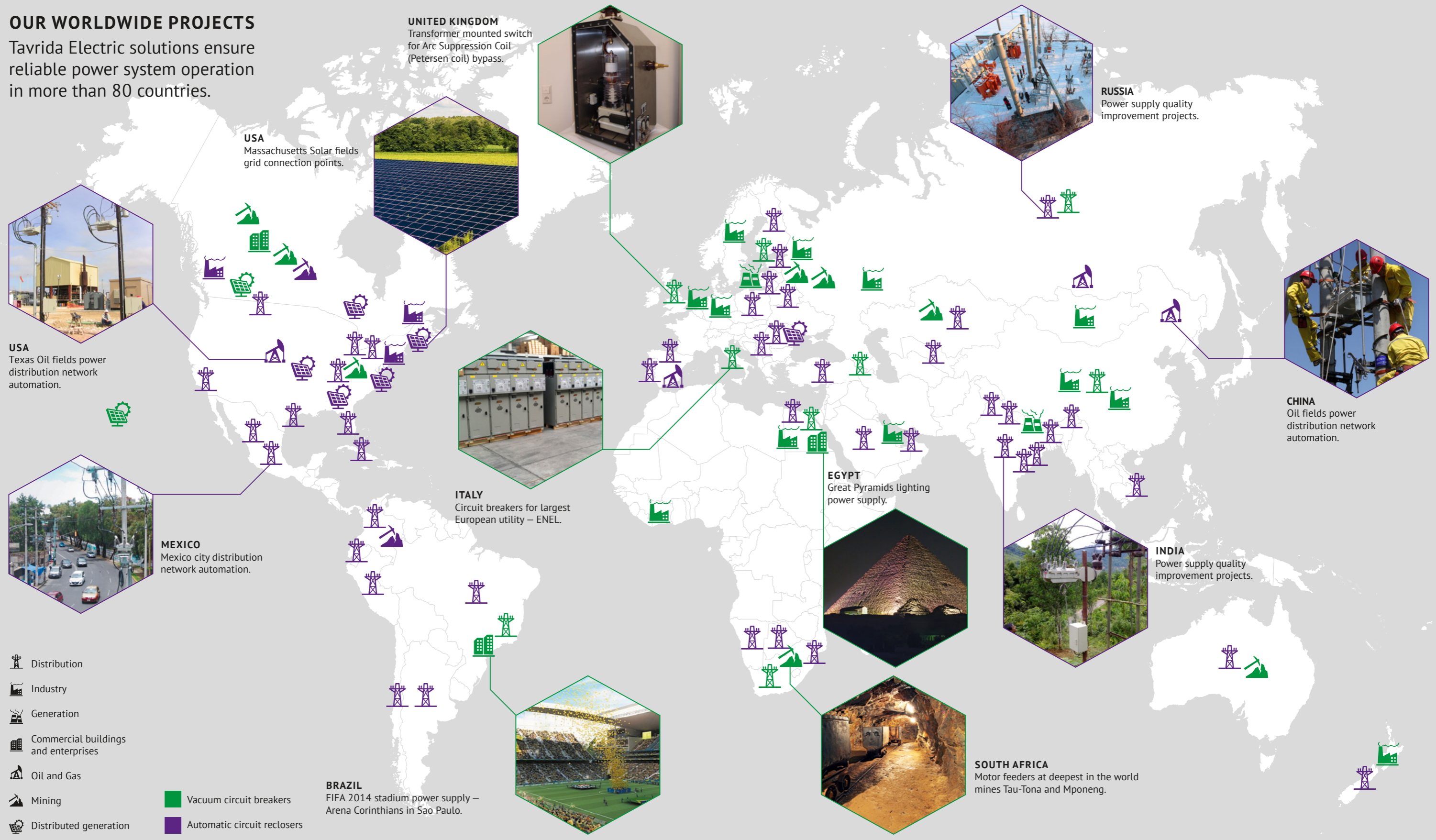
Automatic circuit recloser for substation automation, distributed generation and important load connections. Suitable for ring, radial and meshed overhead lines. A core element of contemporary smart grid networks.





OUR WORLDWIDE PROJECTS

Tavrida Electric solutions ensure reliable power system operation in more than 80 countries.



- Distribution
- Industry
- Generation
- Commercial buildings and enterprises
- Oil and Gas
- Mining
- Distributed generation

- Vacuum circuit breakers
- Automatic circuit reclosers

Vacuum Circuit Breaker (VCB)

SIMPLICITY IS PERFECTION

Gears, springs, bearings, levers and other rotating parts are the most often causes of conventional circuit breaker failure. Luckily Tavrída Electric breakers are better than conventional. Tavrída Electric has simplified its breaker design – completely removing all components prone to failure. As the result VCB has 20 times the reliability of conventional circuit breakers and furthermore doesn't require any maintenance in service.

ANY SPATIAL ORIENTATION

LIGHTEST IN THE WORLD

MOST COMPACT DIMENSIONS

MAINTENANCE FREE

CONTINUOUS SELF-SUPERVISION

SINGLE PHASE OPTION

30,000 CLOSE OPEN OPERATIONS

YOUR SWITCHGEAR, DEFINED AND DESIGNED IN ACCORDANCE WITH YOUR VISION

You know your switchgear best; you know how to optimize its design and how it should operate. That's why the Tavrída Electric VCB series circuit breaker is so revolutionary – because it puts the design control in your hands. With the smallest dimensions on the market and ANY circuit breaker orientation, you are free to optimize your switchgear design, define how to make primary and secondary connections, and lay your

secondary circuits. That means you can guarantee the optimum use of space and convenient access to the control elements without having the need to compromise on something. Want even higher flexibility? Weighing just 34 kg, the Tavrída Electric's circuit breaker is the smallest and lightest circuit breaker in the world. Impress your customers with unique switchgear designs no-one else can copy.

Application



OEM solutions and VCBs for retrofit

Tavrída Electric cooperates with more than 300 switchgear manufacturers and retrofit solutions providers. Over many years of cooperation, Tavrída Electric VCBs have proved versatile and easy-to-use for both new and

existing switchgear panel designs, as well as for retrofit solutions. They are the smallest and lightest solution on the market, work regardless of orientation and are easy to install.



Special application circuit breakers

FAST TRANSFER SWITCHES

with transfer times as fast as 2 cycles. Such quick operational times allow very sensitive loads to operate without interruption in the case of a main power source loss. The fast transfer switch solution:

- eliminates costly downtime,
- reduces production equipment stress,
- ensures quick return on investment.

- reduces costly downtime,
- limits switchgear damage and repair costs.

FAULT CURRENT LIMITER – sub period interruption time limits short circuit current effectively by quickly disconnecting distributed generation sources from the grid.

- allows more distributed generation, to be connected to the grid,
- limits fault current,
- no operational losses,
- enables automatic distributed, generation sources reconnection.

ARC FLASH MITIGATION

with interruption in one period. That quick interruption time:

- increases operational safety,
- reduces switchgear restoration time and loss of productivity,

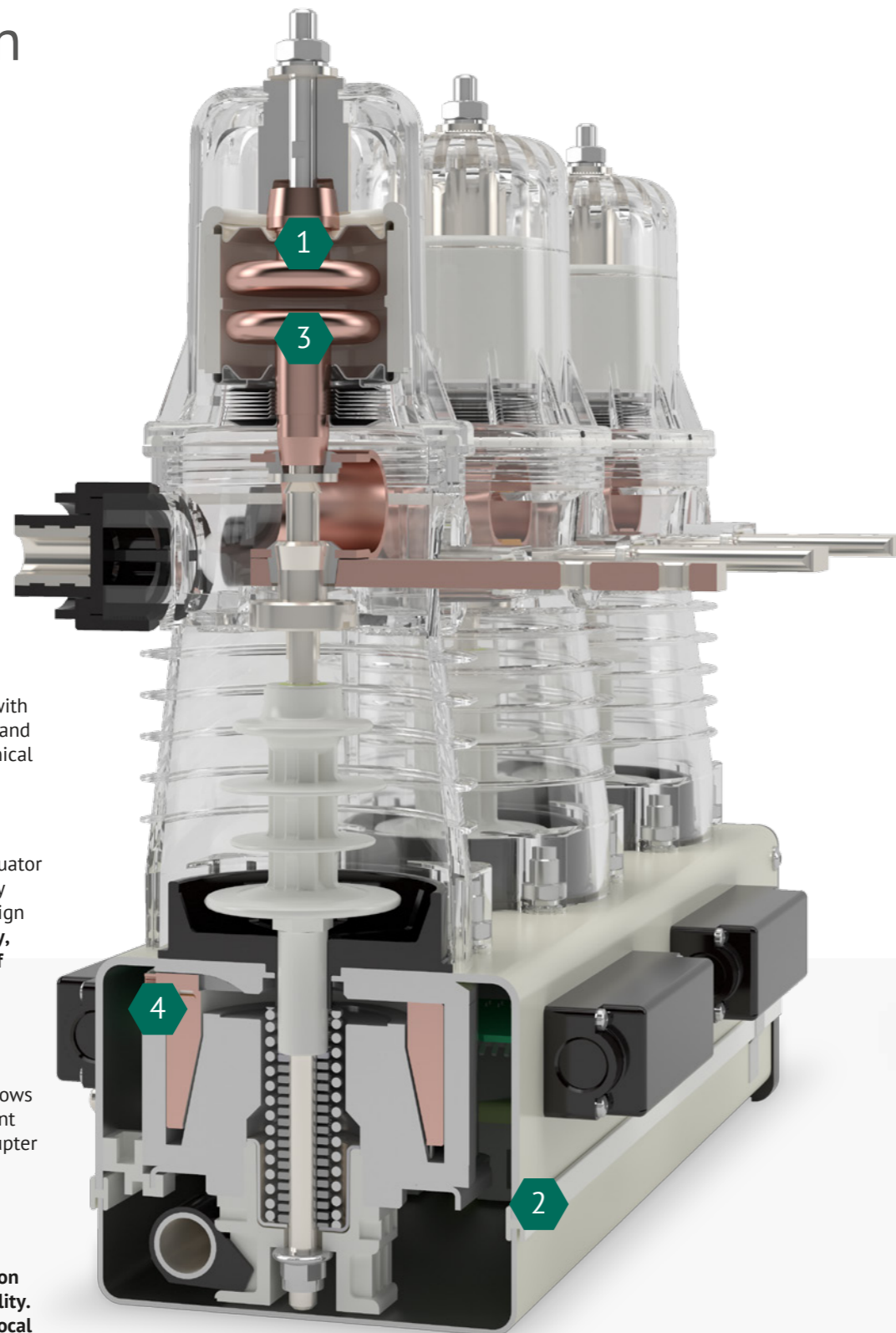


Single phase circuit breakers

Tavrída Electric's circuit breakers are the perfect match for applications like transformers or generators with a neutral earthing, server rooms and point on wave switching. The circuit

breakers weigh less than 14 kg, meaning they can be installed quickly and cost effectively even in the smallest designs.

Design and operation



- 1 Tavrída Electric manufactures compact vacuum interrupters with high interrupting performance and an extraordinarily long mechanical and electrical lifespan.
- 2 The patented design of the actuator allows it to be installed directly underneath each pole. The design is optimal in terms of **reliability, dimensions, weight and ease of installation.**
- 3 The use of robot welded steel discs as opposed to folded bellows eliminates the main failure point of conventional vacuum interrupter designs and maintains a **high vacuum for its entire lifetime.**
- 4 The actuator is **not dependant on the auxiliary power supply quality.** The mechanism enables both **local and remote operation.**

Control module CM_16

The Control Module is an intelligent circuit breaker driver that provides energy for circuit breaker operation. It controls and optimises main contacts movement in the manner that prolongs circuit breaker life and continuously monitors circuit breaker trip and close circuits.

CONTINUOUS SELF-SUPERVISION

Vacuum circuit breakers equipped with the CM16 control module continuously monitor and control switching modules, functional wiring and auxiliary power supply quality. The CM16 eliminates the necessity of additional trip and close coils, charging mechanisms and all related wiring supervision. The whole trip and close circuit supervision comes in a single package with any Tavrída Electric VCB. The CM16 allows the user to forget about scheduled trips and close wiring inspections – as in the event of malfunction a notification will be sent to the operator using one of the inbuilt output relays and indicated by LEDs inbuilt into the control module.

LOW POWER CONSUMPTION

Vacuum circuit breakers equipped with the CM16 control module need less than 42 W – just 10% of what the best alternatives available on the market need! Such low power consumption finally solves the problem of auxiliary power supply – a much less powerful source and UPS can now provide substation auxiliary equipment with the required power.

EASE OF USE AND ROBUSTNESS

CM16 type control modules are connected with the circuit breaker they control and supervise by means of simple wires. This allows the CM installation to be located at any position convenient for the OEM, system integrator or end-user location. Very compact dimensions and low weight further simplify the process. The CM16 has a robust design, enclosed in an aluminium housing it provides a high EMC level confirmed by KEMA test laboratories.



- 5 The energy for switching operations is stored in the Control Module (CM). This reduces **the auxiliary power supply needs to 1/10 of a conventional circuit breaker** and enables significant savings on Substation UPS and auxiliary equipment.
- 6 Embedded intelligence –The CM's **continuous self-supervision** function monitors control, switching modules, functional wiring and auxiliary power supply quality. In the event of malfunction, a notification will be sent to the operator and indicated by inbuilt LEDs.
- 7 The CM can be conveniently installed at a distance from the circuit breaker and connected by means of flexible leads. It significantly simplifies the installation and allows the CM to be installed with other low voltage.

- MAINTENANCE FREE
- CONTINUOUS SELF-SUPERVISION
- MOST ENERGY EFFICIENT
- MOST COMPACT DIMENSIONS AND WEIGHT
- THE FASTEST ON THE MARKET

Light Duty

LD series vacuum circuit breakers for rated continuous current up to 800 A. Available in three-phase and single phase configurations and for rated voltages up to 24 kV.



Single phase Vacuum Circuit Breaker



Tavrída Electric's circuit breakers are the perfect match for applications like transformers or generators with a neutral earthing, server rooms and point on wave switching.

APPLICATION:

- 1 Generation plant: generator neutral earthing.
- 2 Transformer substation: transformer neutral earthing.
- 3 Distributed generation: generator or transformer neutral earthing.
- 4 Building and enterprises: single phase loads switching.
- 5 Distribution: single phase switching.
- 6 Distribution substations: auxiliary power transformer circuit breaker.



- MAINTENANCE FREE
- CONTINUOUS SELF-SUPERVISION
- MOST ENERGY EFFICIENT
- MOST COMPACT DIMENSIONS AND WEIGHT
- THE FASTEST ON THE MARKET

Heavy Duty – Shell series

HD series vacuum circuit breakers for rated continuous currents up to 2000 A.

Using the same single-axis design philosophy as the LD series, the Shell series brings more innovation in a compact package. Standing only 53 cm high, and as narrow as the LD series, the Shell model handles currents as high as 2000 A continuous and 31.5 kA short-time and interrupting. The exceptional shell-type design insulates the phases from each other, with multiple

mounting points incorporated to allow for installation in flexible orientations (vertical or inverted). The Shell series simplifies interlocking functionality using an integrated manual trip lever at the rear to block the unit both electrically and mechanically.



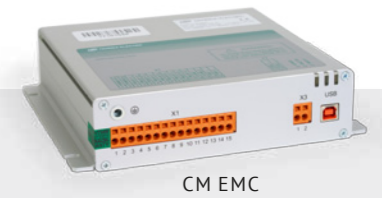
Specification

VCB technical parameters



TYPE	VCB15_LD	VCB15_SHELL	VCB25_LD
Rated voltage (Ur)	≤ 12 kV	≤ 17.5 kV	≤ 24 kV
Rated normal current (Ir)	≤ 800 A	≤ 2000 A	≤ 800 A
Rated power frequency withstand voltage (Ud)	28 (42) kV	38 (42) kV	50 kV
Rated lightning impulse withstand voltage (peak) (Up)	75 kV	95 kV	125 kV
Rated short-circuit breaking current (Isc)	≤ 20 kA	≤ 31.5 kA	≤ 16 kA
Rated peak withstand current (Ip)	≤ 50 kA	≤ 82 kA	≤ 40 kA
Rated short-time withstand current (Ik)	≤ 20 kA	≤ 31.5 kA	≤ 16 kA
Rated duration of short circuit (tk)		4 s	
Rated frequency (fr)		50/60 Hz	
Mechanical life (CO-cycles)	50,000	30,000	
Closing time	≤ 70 ms	≤ 60 ms	≤ 70 ms
Opening time	≤ 35 ms	≤ 35 ms	≤ 35 ms
Break time	≤ 45 ms	≤ 45 ms	≤ 45 ms
Rated operating sequence	O-0.1s-CO-10s-CO-10s-CO		
Standards	IEC 62271-100GB 1984-2003	IEC 62271-100GB 1984-2003	IEC 62271-100
Resistance of main circuit	≤ 40 μOhm	≤ 18 μOhm	≤ 40 μOhm
Weight (depending on Pole centre distance) for three-phase ISM	34-36 kg	51-55 kg	35-38 kg
Weight of single phase ISM	13 kg	-	14 kg
Weight of CM		1 kg	
Overall dimensions of CM		190x165x45 mm	
Altitude above sea level		1000 m	
Relative humidity in 24 hours		≤ 95%	
Relative humidity over 1 month		≤ 90%	
Temperature Range		- 25°C... +55°C	
Degree of protection according to IEC 60529		IP40	
Type of driving mechanism		Monostable magnetic actuator	
Number of available auxiliary contacts for three-phase ISM		6 NO + 6 NC	
Number of available auxiliary contacts for single-phase ISM		2 NO + 2 NC	
Charging the close and trip capacitors of CM_16_1(60_x_x)		≤ 25 W	
Charging the close and trip capacitors of CM_16_1(220_x_x)		≤ 42 W AC / ≤ 37 W DC	
Permanent power consumption (standby) of CM_16_1(60_x_x)		≤ 5 W	
Permanent power consumption (standby) of CM_16_1(220_x_x)		≤ 7 W AC / ≤ 5 W DC	

Control module EMC parameters



PARAMETER	APPLICABLE STANDARD	RATED VALUE
Electromagnetic compatibility (emc) requirements		
Electrostatic discharge	IEC 60255-26 IEC 61000-4-2	8 kV contact 15 kV air
Radiated EM field Immunity	IEC 60255-26 IEC 61000-4-3	80 MHz – 3 GHz Sweep & spot AM 1 kHz 80% 10 V/m
Fast transient burst Immunity	IEC 60255-26 IEC62271-1 IEC 61000-4-4	4 kV common mode
Surge Immunity	IEC 60255-26 IEC 61000-4-5	4 kV common mode 2 kV differential mode
Conducted disturbance induced by Radio frequency fields	IEC 60255-26 IEC 61000-4-6	150 kHz – 80 MHz AM 1 kHz 80% 10 V
Power Frequency Magnetic Field	IEC 60255-26 IEC 61000-4-8	100 A/m continuously 1000 A/m 1 sec
Pulse Magnetic Field	IEC 61000-4-9	1000 A/m
100 kHz Damped Oscillatory Magnetic Field	IEC 61000-4-10	100 A/m
1 MHz damped oscillatory magnetic field	IEC 61000-4-10	100 A/m
AC Voltage Dips and Interruptions	IEC 60255-26 IEC 61000-4-11	ΔU 30% 1 period ΔU 60% 50 periods ΔU 100% 5 periods ΔU 100% 50 periods
Power Frequency Disturbance Voltage	IEC 60255-26 IEC 61000-4-16	300 V common mode 150 V differential mode
100 kHz and 1 MHz Damped Oscillatory Wave Immunity	IEC 60255-26 IEC 62271-1 IEC 61000-4-18	2.5 kV common mode 1 kV differential mode
Ripple on DC Power Supply	IEC 60255-26 IEC 61000-4-27	10% of Supply voltage, 100 Hz
DC Voltage Dips and Interruptions	IEC 60255-26 IEC 62271-100 IEC 61000-4-29	ΔU 30% 2 sec ΔU 60% 2 sec ΔU 100% 0.3 sec ±20% 10 sec

Circuit breaker selection guide



VCB15_LD VCB25_LD

Three phase light duty circuit breakers

VCB15_LD1_16F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8
VCB application type	CB	CB							
Rated voltage	12 kV		12						
Rated short circuit current	20 kA			20					
Rated normal current	800 A				800				
Pole centre distance	150 mm 180 mm 210 mm					150 180 210			
Main low terminal of ISM	one main lower terminal two main lower terminals							1 2	
Range of rated supply voltage of auxiliary circuits	24–60 V DC 110–220 V AC/DC								60 220
Customization	For customized options consult local representative								

VCB25_LD1_16F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8
VCB application type	CB	CB							
Rated voltage	17.5 kV 24 kV		17.5 24						
Rated short circuit current	12.5 kA 16 kA			12.5 16					
Rated normal current	630 A 800 A				630 800				
Pole centre distance	210 mm 275 mm					210 275			
Main low terminal of ISM	one main lower terminal							1	
Range of rated supply voltage of auxiliary circuits	24–60 V DC 110–220 V AC/DC								60 220
Customization	For customized options consult local representative DY800								

DY800



VCB15_SHELL

Three phase heavy duty circuit breaker

VCB15_SHELL2_16F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8
VCB application type	CB	CB							
Rated voltage	12 kV 17.5 kV		12 17.5						
Rated short circuit current	31.5 kA			31.5					
Rated normal current	1250 A 2000 A				1250 2000				
Pole centre distance	150 mm 210 mm 275 mm					150 210 275			
Main low terminal of ISM	one main lower terminal							1	
Range of rated supply voltage of auxiliary circuits	24–60 V DC 110–220 V AC/DC								60 220
Customization	For customized options consult local representative								

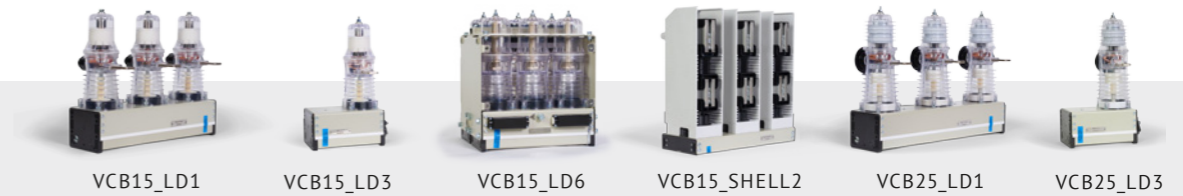
Single phase light duty circuit breakers




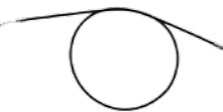



VCB15_LD3_16F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8
VCB application type	CB	CB							
Rated voltage	12 kV	12							
Rated short circuit current	20 kA		20						
Rated normal current	800 A			800					
Pole centre distance	not applicable					NA			
Main low terminal of ISM	one main lower terminal						1		
Range of rated supply voltage of auxiliary circuits	24–60 V DC 110–220 V AC/DC							60 220	
Customization	For customized options consult local representative								

VCB25_LD3_16F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8
VCB application type	CB	CB							
Rated voltage	24 kV	24							
Rated short circuit current	10 kA		20						
Rated normal current	800 A			800					
Pole centre distance	not applicable					NA			
Main low terminal of ISM	one main lower terminal						1		
Range of rated supply voltage of auxiliary circuits	24–60 V DC 110–220 V AC/DC							60 220	
Customization	For customized options consult local representative								

VCB accessories selection

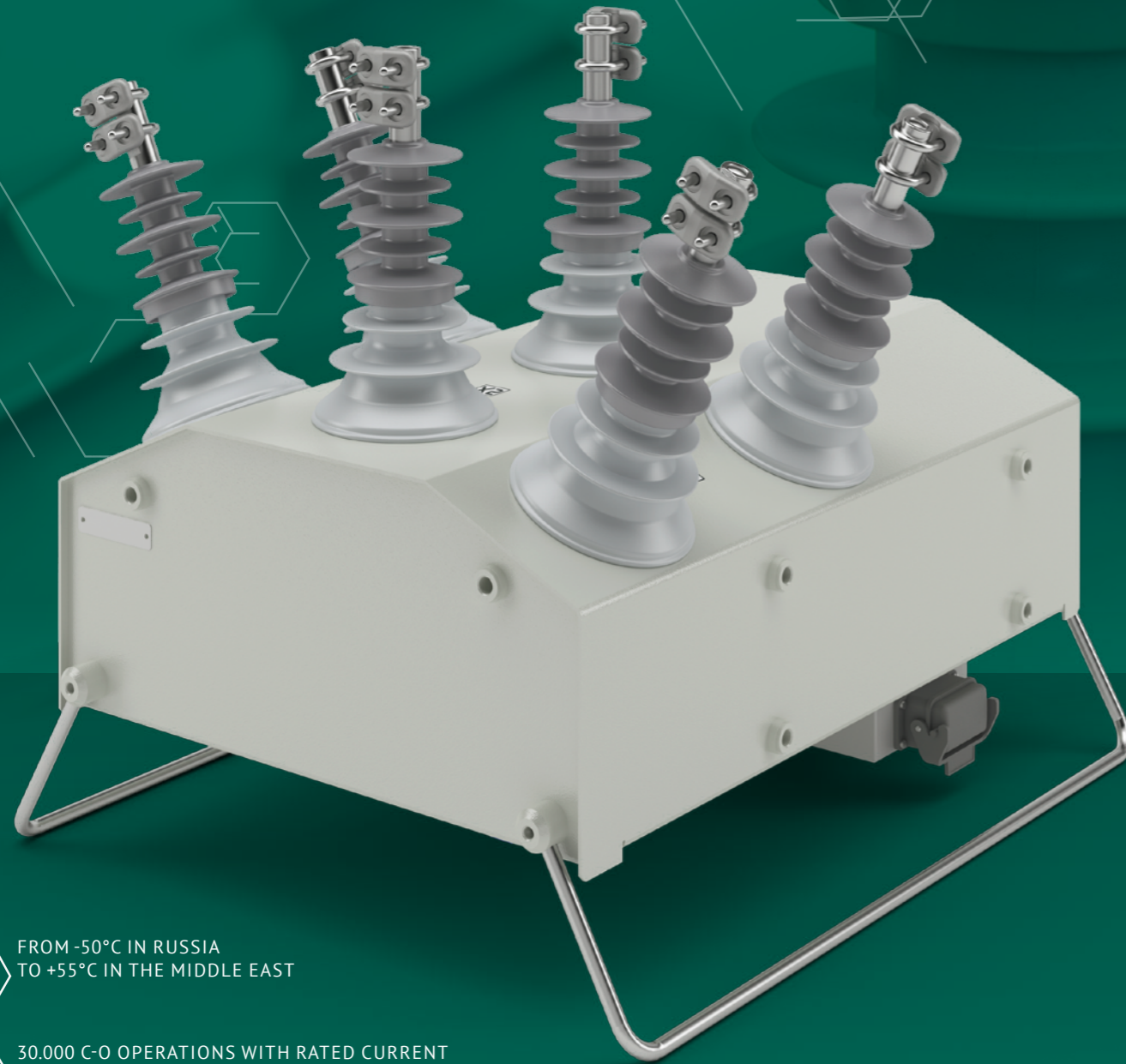


Unit	Applicability per unit					
	VCB15				VCB25	
	LD1	LD3	LD6	SHELL2	LD1	LD3
	16F	16F	16RD	16F	16F	16F
Manual generator ManGen is used to charge the CM in cases where the main auxiliary power supply is not available. 	TES_CBunit_ManGen_1 Manual generator for CM_16_1(220_Par2_Par3) ManGen_1	1	1	1	1	1
	TES_CBunit_ManGen_2 Manual generator for CM_16_1(60_Par2_Par3) ManGen_2	1	1	1	1	1
Accessories 	TES_CBkit_Interlock_1 Interlocking kits CBkit_Interlock_1 attaches to the ISM synchronizing shaft and serves as an interface for various manual trip / indication / lockout accessories.	1				1
	TES_CBcomp_RelCable_1(1000) Release cable RelCable_1 is a flexible 1 meter long release cable used for interlocks for ISM position indicator connection to the ISM.	1	1			1
	FS-SM_Unit_PosInd_3 Position Indicator PosInd_3 is a position indicator used together with the release cable RelCable_1 to indicate the ISM main circuit position.	1	1			1



Automatic circuit reclosers

Designed and built to last, the Tavrida Electric recloser combines the best of the Tavrida Electric vacuum circuit breaker's features: innovative insulation materials, high precision sensors and sophisticated numerical control.



FROM -50°C IN RUSSIA
TO +55°C IN THE MIDDLE EAST

30.000 C-O OPERATIONS WITH RATED CURRENT
OR 200 OPERATIONS WITH FULL SHORT-CIRCUIT
BREAKING CURRENT

Application



Feeder Automation

RADIAL LINE RECLOSER

When a recloser is installed on a radial feeder it automatically clears transient faults and isolates permanent faults. More than one recloser can be installed on a feeder to isolate faults selectively and ensure fewer customers are affected.

LOOP RECLOSER

A loop recloser further improves the reliability of a power supply by automatically

- isolating faulty sections
- reconfigures the network to minimize the amount of customers without power supply

Loop reclosers are the best option to maximize reliability performance indicators of your distribution network.

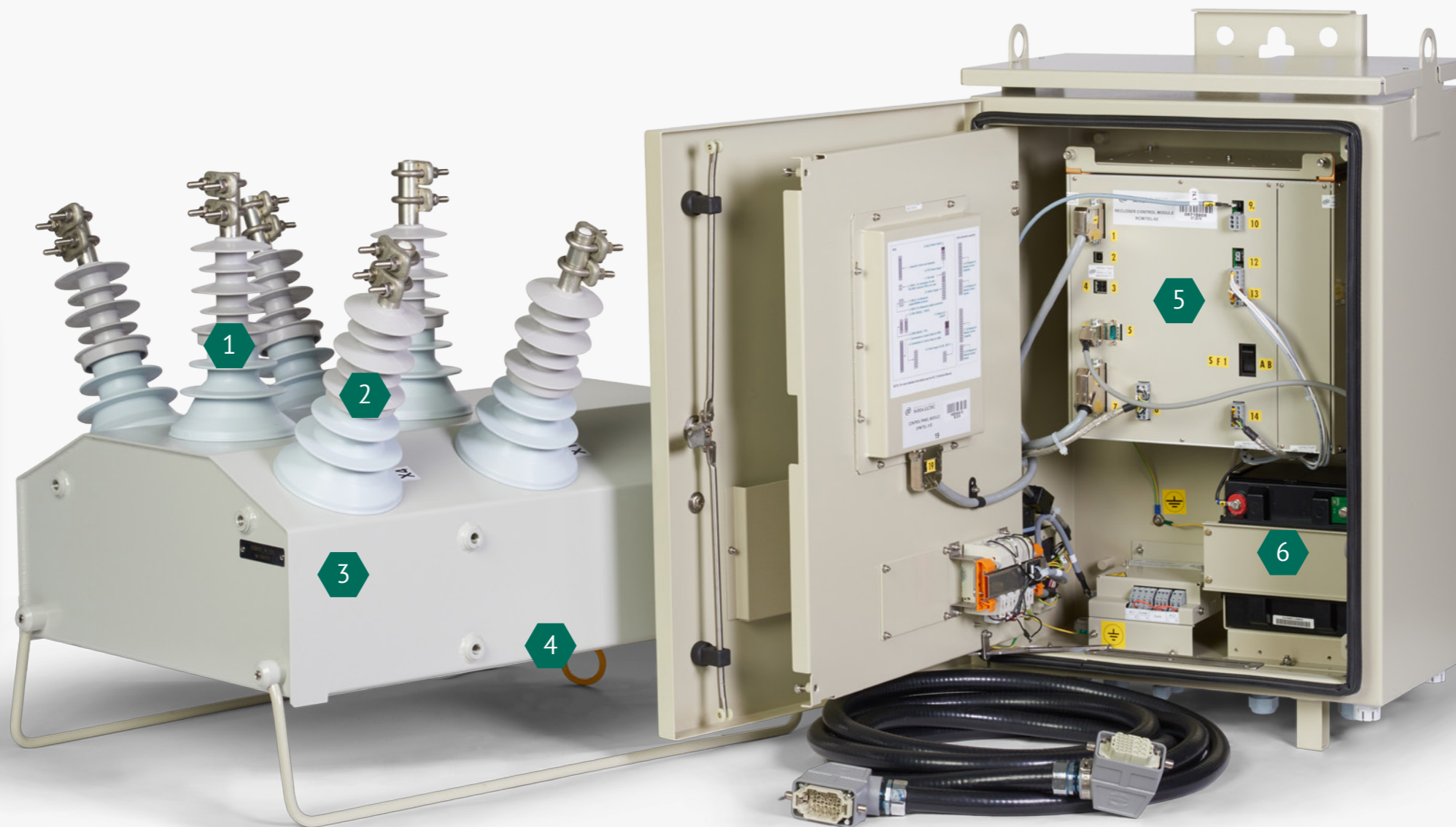
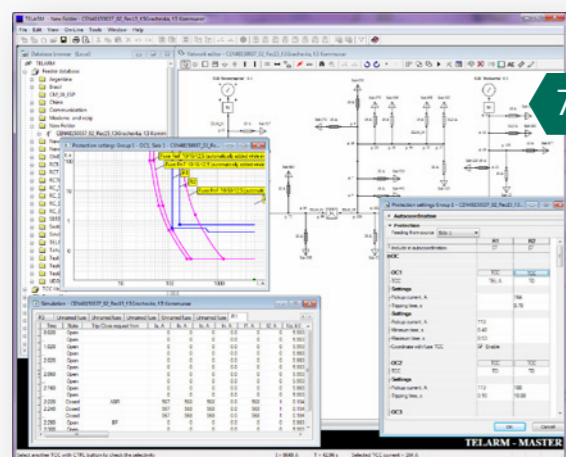


Substation Automation

The Tavrida Electric recloser can be used to quickly build a cost-effective unmanned structure mounted outdoor substation. Providing full protection and automation functionality required at the substation.



Design and operation



- 1 The air insulated, **corrosion-resistant** tank incorporates a solidly insulated circuit breaker, sensors and auxiliary mechanisms.
- 2 Each of the six bushings are made of UV stable, hydrophobic polymer, that guarantees reliable performance in heavily polluted areas. Confirmed by environmental testing in KIPTS*.
- 3 The 6x current and 6x voltage high accuracy sensors. Voltage sensors allow measurements to be taken from either side of the recloser.
- 4 Mechanical trip hook for OSM manual operation. For **superior linesman safety**, the hook in the downwards position electrically isolates the actuator's circuit to prevent the possibility of any unintended recloser operation.

- 5 The recloser protects the network against overcurrent, earth faults, over- and under-voltage, over- and under-frequency, current and voltage imbalances, and many other problems. The control box has an embedded RTU that provides communication with SCADA over various communication protocols: DNP3, Modbus, IEC-104.
- 6 The control cubicle has an inbuilt large battery and smart battery charger to improve battery life. The battery allows 48 hrs of operation with no auxiliary power supply present.
- 7 TELARM**® user software allows local and remote device control and configuration, downloading loads, fault and load profiles and oscillogram. TELARM® is the first recloser software that allows automatic protection settings coordination, various failure modes simulation, devices configuration and remote control in single package!

BEST VALUE FOR THE MONEY

With a maintenance-free design rated to perform 30,000 open and close operations, Tavrída Electric reclosers keep expenses to a minimum over their entire lifespan. They are installed on typical overhead feeders, significantly improving a network's key performance indicators and their use results in a quick return on investment.

SOPHISTICATED CONTROL AND PROTECTION

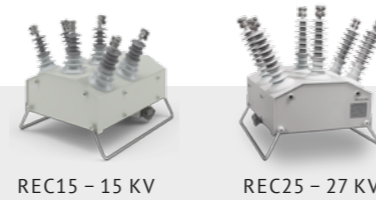
from various faults, including: short circuits, earth faults, high impedance earth faults, broken wires, islanding, incorrect tap changer operations, network overload and over- or under-generation. The embedded RTU and metering ensures the reclosers are SCADA-ready with no additional expenses.

TELARM® DISPATCHER AND DUAL-SCADA

TELARM® Dispatcher is a proprietary remote control and monitoring system that works as a standalone SCADA and/or in parallel with an existing SCADA system, acting as a back-up method of controlling and monitoring reclosers. TELARM® Dispatcher offers a number of features not available with most conventional SCADA systems, such as remote access to system logs, fault and load profiles and the remote control of protection settings.

* Koeberg Insulator Pollution Test Station (KIPTS) is known internationally as a severe environmental testing facility run by ESKOM, in South Africa
**Tavrída Electric Automated Relay Manager

Specification



REC15 - 15 KV REC25 - 27 KV

REC technical parameters

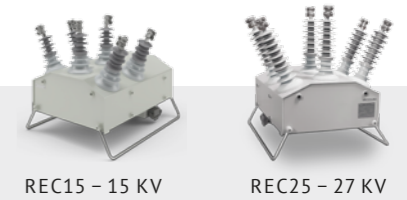
PARAMETER	OSM15_AL_1	OSM25_AL_1
Rated data		
Rated maximum voltage (Ur)	15.5 kV	27 kV
Rated continuous current (Ir)	630 A	
Rated short-duration powerfrequency withstand voltage (Ud), 1 min dry	50 kV	60 kV
Rated lightning impulse withstand voltage (peak) (Up)	110 kV	125 kV
Rated short-circuit breaking current (Isc)	16 kA	12.5 kA
Rated peak withstand current (Ip)	41.6 kA	32.5 kA
Rated short-time withstand current (Ik)	16 kA	12.5 kA
Rated duration of short circuit (tk)	4 s	
Rated cable-charging current switching	10 A	25 A
Rated line-charging current switching	2 A	5 A
Rated frequency (fr)	50/60 Hz	
Switching performance		
Mechanical life (CO-cycles)	30,000	
Operating cycles, rated current (CO-cycles)	30,000	
Closing time, not more than	77 ms	
Opening time for overcurrent protection according to IEC 62271-111/C37.60, not more than (at I>2xIp)	43 ms	
Opening time for overcurrent protection according to IEC 62271-111/C37.60, not more than (at I>2xIp)	51 ms	
Rated operating sequence	0-0.1s-CO-2s-CO-2s-CO	
General information		
Main circuit resistance	< 85 μOhm	< 95 μOhm
Weight	68 kg	72 kg
Altitude	2000 m (derating according to ANSI C37.60 applied above 1000 m)	
Solar radiation	≤ 1.1 kW/m ²	
Temperature range	40°C... +55°C	
Degree of protection	IP 65	
Pollution level	very heavy (as per IEC 60815)	

POWER SUPPLY CHARACTERISTICS

PARAMETER	VALUE
Supply voltage range, V	85 ÷ 265 AC, 110 ÷ 220 DC*
Rated power consumption, VA, not more	40
Maximum power consumption, VA, not more	75
Duration of operation without auxiliary supply, hours	48

* Note that additional DC circuit breakers are required.

Recloser selection guide



REC15 - 15 KV REC25 - 27 KV

REC15_AL1_5S / RE25_AL1_5S		Par1	Par2	Par3	Par4	Par5	Par6
Language	Portugese English	PT EN					
Bluetooth Module	Without With		0 1				
Input/Output Module (IOM)	Without 12-60 V DC 100-250 V DC			0 60 220			
Umbilical length	5 metres 7 metres 12 metres 20 metres				5 7 12 20		
Mounting Bracket	None Standard mounting bracket Other – Contact Tavrída Electric representative					0 7 ...	
Customization	Default Other – Contact Tavrída Electric representative						0 ...

Recloser accessories selection

Tavrída Electric has designed a variety of accessories that facilitate the Rec integration.

TestSet_AR_2(2)		Test bench for RC5 testing with imitation of OSM sensors.
EA_IntBoard_IOM-03		RC5 Recloser cubicle input/output module with control voltage 100-250 V
EA_IntBoard_IOM-04		RC5 Recloser cubicle input/output module with control voltage 12-60 V.
RecComp_BT_M_1		Bluetooth module provides ability to connect Recloser Control Cubicle with a computer for local control and monitoring.
RecKit_Ins_1		Provide protection against wildlife induced faults.



State of the art Recloser Control Cubicle – RC



PROTECTION

The recloser protects against overcurrent, earth faults, over- and under-voltage, over- and under-frequency, current and voltage imbalances and many other problems.

MEASUREMENTS

The recloser can measure phase, neutral and sequence currents, phase-to-phase and sequence voltages and three-phase active and reactive power and energy. Key measurement data can be logged.

COMMUNICATIONS

The control cubicle has various communication interfaces and can be connected with any third party modem via RS-232/RS-485 or the Ethernet using various communication protocols, including Modbus, DNP3 and IEC-104.

LARGE BATTERY

48hrs operation battery, charged by smart battery charger and maintenance free for up to 10 years.

MONITORING

Highly comprehensive, remotely accessible separate log files for load and fault profiles, events, malfunctions, lifetime and change messages.

CONTROL CUBICLE

– the recloser control cubicle is made from lightweight powder-coated anodized aluminum,
– the control panel has a graphical LCD for clear event indication, comprising six-lines of 40-characters.

* please consult local representative for additional information on these services.

USER SOFTWARE

The Tavrída Electric Automated Relay Manager (TELARM) is designed for the specific needs of electricity distribution networks. It allows:
– downloading of logs, profiles, oscillograms, settings, etc.
– uploading protection, communication and systems settings,
– recording of logs (event, malfunction, communication etc) and detailed fault profiling,
– the customising of a control signal map for a customer's SCADA applications.



Recloser Control Cubicle Protection and automation functions

Function	ANSI function code	IEC function designation
Overcurrent	50/51	I>, I>>, I>>>
Earth Fault	50N/51N	I0>>, I0>>>, I0>>>>
Sensitive Earth Fault	50/51SEF	I0>/SEF
Auto-Reclose (4 shots)	79	AR
Automatic backfeed restoration	ABR	ABR
Undervoltage	27	U<
Voltage Unbalance	47	U2/U1
Current Unbalance	46	I2/I1
Underfrequency	81	f<
Hot Line (Live Line)		
Cold Load Pickup Restrain		
Inrush filter	68	
Switch on to fault	50 SOTF	
Lockout	86	
User Defined Logic	PSL	
Controller self-supervision		
Circuit breaker supervision		

Communication			
Interfaces		Protocols	
RS-232	Bluetooth	IEC 60870-5-104	Modbus
RS-485	Ethernet	DNP3	TELARM® Protocol
Wi-Fi	USB		
GPRS			



Certificates

“DEKRA Certification B.V.” auditors praised the “Tavrida Electric” quality management system and noted attention and active involvement of managers and staff at all levels in the continuous improvement of the company’s operations.



Tavrida Electric Vacuum Circuit Breakers

Tavrida Electric VCBs are designed and manufactured to strictly comply with the latest revision of IEC 62271-100. World known independent Laboratories STL liaison members.



ROUTINE TEST

- Dielectric tests
- Measurement of the resistance of the main circuit
- Temperature rise test
- Short-time withstand current and peak withstand current test
- Extended mechanical operation test
- Short-circuit current making and breaking test
- Single and double earth fault test
- Shortline fault test
- EMC tests for control electronics
- Extended electrical endurance test
- Capacitive currents switching test



Tavrida Electric Reclosers

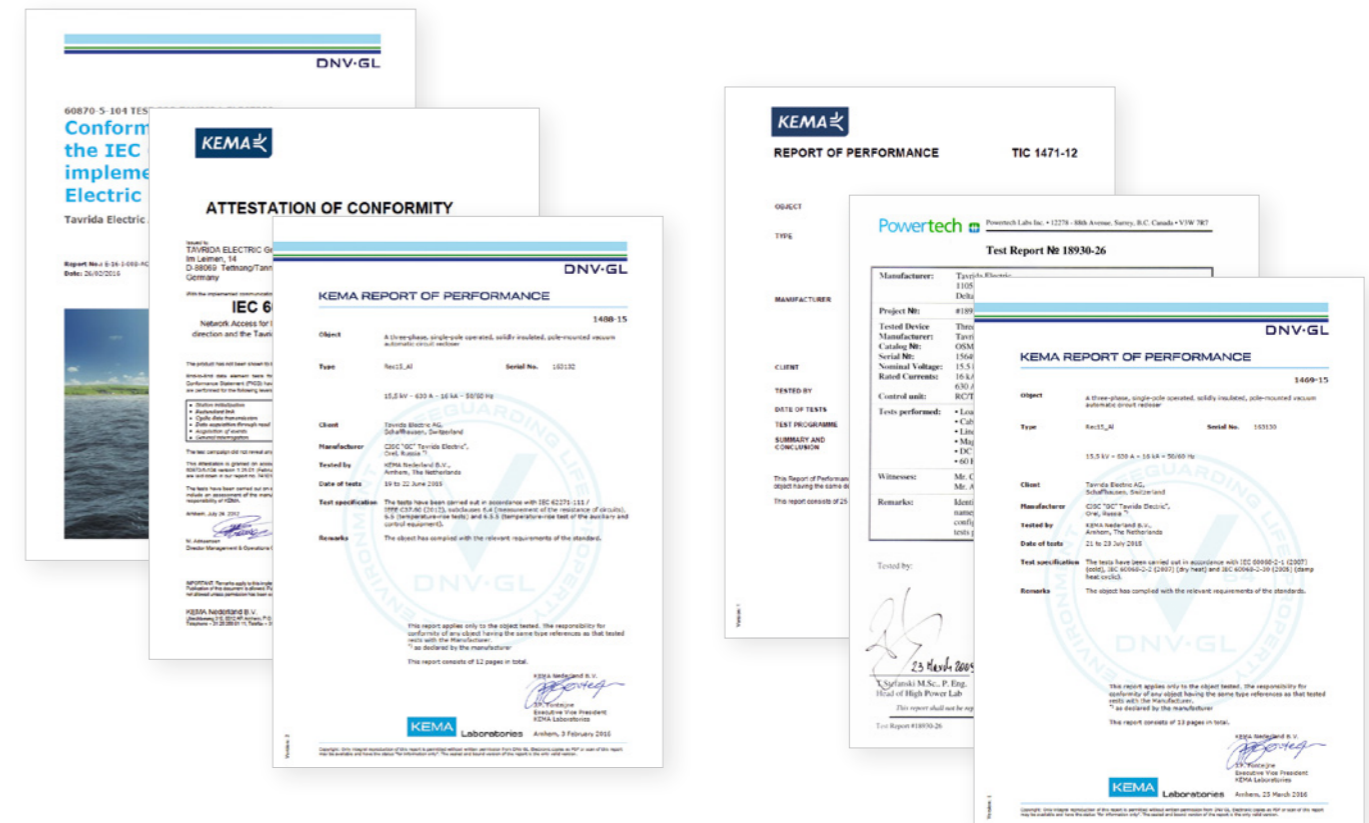
The Rec series automatic circuit reclosers are designed and manufactured to strictly comply with the latest revisions of IEEE C37.60 and IEC 62271-111

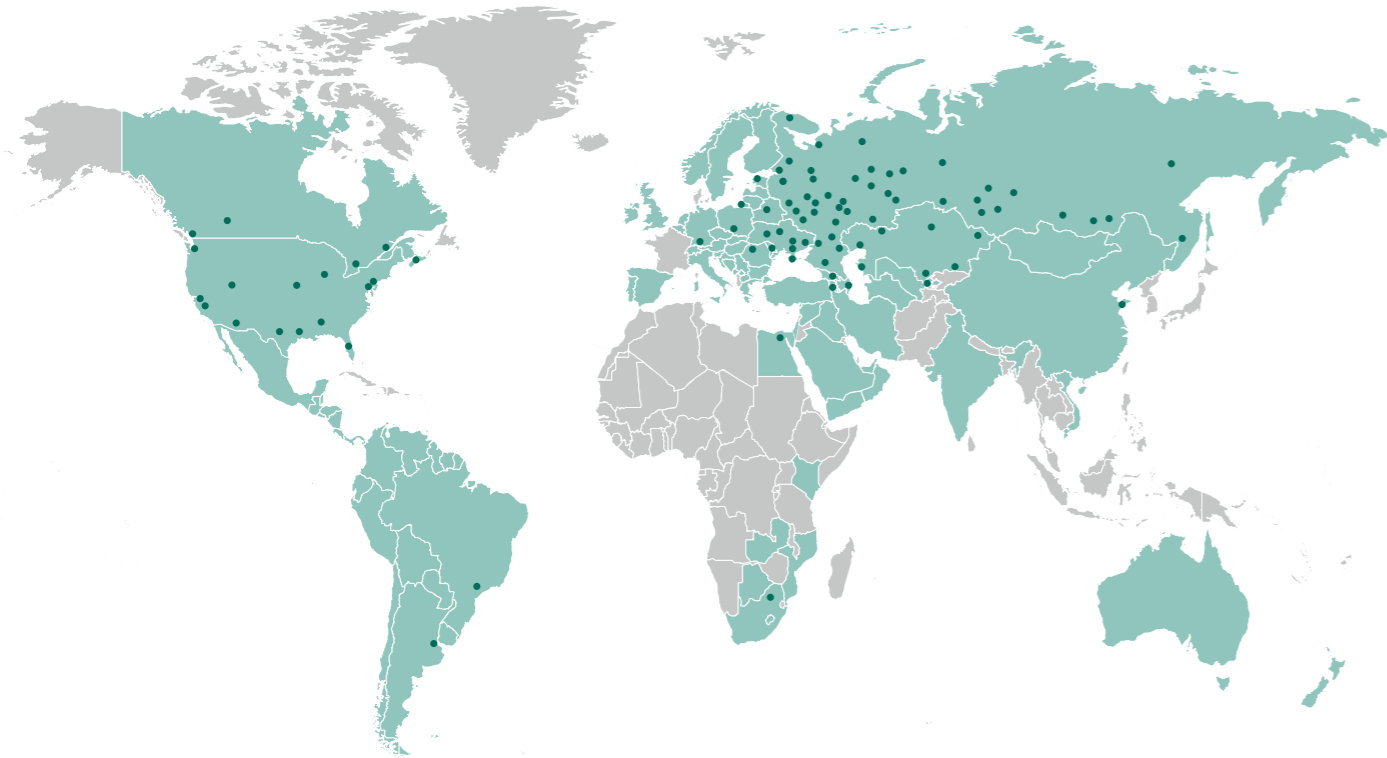
Each assembled Rec series recloser is subjected to routine testing in accordance with IEEE C37.60/IEC 62271-111 at the factory



ROUTINE TEST

- Visual check and functionality tests
- Dielectric withstand test
- Measurement of the resistance of main circuit
- Reclosing and overcurrent calibration
- Mechanical operation test
- Partial discharge test





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